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EFFECTS OF PERSONAL CONTROL, EXTRINSIC REWARDS, AND COMPETENCE ON INTRINSIC MOTIVATION

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This report investigated three of the possible determinants of intrinsic motivation identified by Pritchard and Montagno (1978) in an earlier phase of this project. The three variables of concern were feelings of personal control, feelings of competence, and type of extrinsic reward system.

A literature review revealed that the effects of personal control on intrinsic motivation had never been evaluated, that a suggested interaction of competence and personal control had not yet been investigated, and that studies comparing the effects of contingent versus noncontingent reward systems on intrinsic motivation had produced conflicting results and conclusions. Further, most of the research reviewed had been conducted under laboratory conditions which limit its generalizability to actual jobs in Air Force environments.

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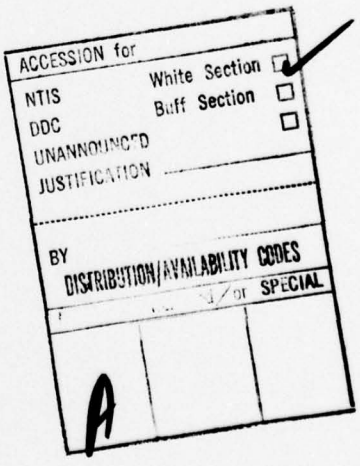
Therefore, a study was designed wherein personal control over performance and payment systems were manipulated in a simulated work setting. It was found that personal control was a very important determinant of intrinsic motivation but that type of payment system did not affect intrinsic motivation in the work setting. An interaction between personal control and competence was found such that *both* performance and personal control had to be high in order for intrinsic motivation to be high. The implications of these results for job design were discussed.

PREFACE

The work reported in this study was funded by the Air Force Office of Scientific Research (AFOSR). This work was related to ongoing research in the Occupation and Manpower Research Division of the Air Force Human Resources Laboratory. Dr. Joe T. Hazel and Capt John O. Edwards, Jr., were the monitors from this Division. The research was completed under project 2313, Human Resources; task 2313T1, Job Requirements and Personnel Utilization; work unit 2313T107, Improved Productivity Through Use of Intrinsic Rewards.



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EFFECTS OF PERSONAL CONTROL, EXTRINISIC REWARDS, AND COMPETENCE ON INTRINSIC MOTIVATION

I. INTRODUCTION

To obtain optimum effectiveness from its personnel, the Air Force has two basic strategies at its disposal. The first is to place the best person in the field. This is attempted through selection and training. The second strategy is to maximally motivate the person once he or she is on the job.

If we focus on the second of these strategies, there are two basic types of approaches to motivation – extrinsic and intrinsic. The focus of this report, and indeed the entire research project of which this forms a part, is on the latter approach, intrinsic motivation.

Intrinsic motivation may be defined as a state wherein the person values performing on the job in and of itself. That is, he experiences positive affect when he works in the job due to such factors as feelings of accomplishment, challenge, and a sense of personal involvement.

In our attempts to explore the determinants of intrinsic motivation, (Pritchard & Montagno, 1978) a series of fourteen possible factors were identified. These were:

1. Feelings of personal control over the task.
2. Feelings of competence at doing the task.
3. Contingent extrinsic rewards. (negatively related)
4. Degree of variety in the skills required to do the task.
5. Degree to which the task requires the use of valued abilities.
6. Degree to which the person identifies with the task.
7. Degree to which the person does a complete unit of the task.
8. Perceived significance of the task.
9. Degree of autonomy on the task.
10. Adequacy of performance feedback.
11. Higher order need strength.
12. Work values.
13. Cultural influences.
14. Optimal arousal level.

The major purpose of the research program is to systematically examine some of these possible determinants in an experimental setting and to explore their effects on motivation, productivity, and satisfaction. The logic is to explore these potentially powerful variables in a relatively inexpensive setting, such as in job simulation studies, and from these studies isolate the best possible procedures for testing in a field setting. Thus, the ultimate goal is to take a subset of these variables and procedures into an Air Force field setting and to assess their effectiveness for enhancing productivity.

This particular report deals with three of these variables: feelings of personal control, feelings of competency, and extrinsic rewards.

A feeling of internal control or "personal causality" has been hypothesized to be a major determinant of intrinsic motivation by Deci (1975) and DeCharms (1968). DeCharms says that people are intrinsically motivated when they feel that they are the "Origin" of their own behavior rather than the "Pawn" of an external force or agent.

This idea can readily be applied to the work setting. A person should feel like the locus of causality for his own behavior and thus be intrinsically motivated when he has the freedom and autonomy to determine how and when to do his work. The external locus of causality referred to above could be an incentive, close supervision, threats of punishment, or anything else which compels one to work for external reasons.

Although the personal causality idea is a very popular and widely held view, no research has been conducted which directly tests whether or not a feeling of personal control is a determinant of intrinsic motivation. The closest approximation to such a test is probably a study conducted by Lepper and Greene (1975). These researchers investigated the effects of surveillance on intrinsic motivation. They reasoned that when a subject is watched by an experimenter, he should feel that he is working on the task because of the experimentor and thus feel that the locus of causality for his behavior is external to himself. Conversely, when the subject is not observed, he should feel that he is working on the task because he wants to, and his locus of causality will be internal. If this reasoning is correct, and if locus of causality is a determinant of intrinsic motivation, then being observed should result in lower levels of intrinsic motivation than not being observed, and this is exactly what the data showed. Thus, it appears that personal control may be related to intrinsic motivation, but that more research is necessary to verify this hypothesis.

Another variable which may affect intrinsic motivation is feelings of compentence. Relatively little work has been done on the notion that competence and high performance lead to intrinsic motivation, perhaps because it seems like such an obvious connection. Deci (1972a) was one of the first to study this relationship. He rewarded some of his subjects with praise for solving or attempting to solve puzzles. The praised group presumably felt more competent as a result of this positive feedback and, as expected, showed higher levels of intrinsic motivation than the group which did not receive praise.

Another study by Deci, Cascio, and Krusell (1973) investigated the effect of negative feedback on intrinsic motivation. They found that subjects who were led to believe that they were low performers (low competence) had lower intrinsic motivation than subjects who were average performers.

Deci (1975) has suggested that feelings of personal causality may interact with feelings of competence to produce intrinsic motivation. If one is a high performer but is not responsible for his high performance (had low personal control), then perhaps competence has no effect on intrinsic motivation. This is a very tentative proposal which has not yet been tested.

The third variable which may affect intrinsic motivation is monetary extrinsic reward. The research studies investigating this variable can be classified into three types: those which test the effects of performance contingent reward versus no reward on intrinsic motivation; those which test the effects of noncontingent reward versus no reward; and those which test the relative effects of the two types of reward systems, contingent and noncontingent.

The first category, contingent reward versus no reward was investigated in studies by Deci (1971, 1972b) and Pritchard, Campbell, and Campbell (1977). Subjects for all three studies were college students who worked on puzzle tasks. In all these cases, subjects being paid according to how well they performed showed lower intrinsic motivation than subjects who were not paid at all.

The second category, noncontingent reward versus no reward studies, included the work of Calder and Straw (1975), Ross, Karniol, and Rothstein (1976), Kruglanski, Friedman, and Zeevi (1971), and Reiss and Sushinski (1975). These researchers used college students, high school students, and young children as subjects. All four studies reported that giving a reward merely for participating in the experiment (noncontingent on performance) resulted in decreased intrinsic motivation on a variety of interesting tasks.

The final question to be investigated asks which one of the two types of reward systems decreases intrinsic motivation the most. Deci (1972a) addressed this issue using college students who were rewarded contingently or noncontingently for working on a puzzle task. The noncontingent group showed no decrease in intrinsic motivation relative to a no reward control group, while the contingent reward group showed a large decline in intrinsic motivation.

A second study, by Greene and Lepper (1974) did not set out to investigate reward contingency. Instead they looked at what they called "performance demand." One group of children was told that everyone would get a reward for participating in the experiment (low performance demand – actually noncontingent payment) while another group was told that only the best participants would receive a reward (high performance demand – actually contingent payment). They found that performance demand, that is, type of reward system, did not affect intrinsic motivation at all.

Karniol and Ross (1975) found that contingent reward actually increased intrinsic motivation relative to no reward and noncontingent reward. They explain these results by pointing out that their contingent reward served as positive performance feedback, and thus enhanced another determinant of intrinsic motivation, feelings of competence.

The results of these last three studies clearly conflict. We do not know which type of payment system is the most harmful to intrinsic motivation. This lack of convergence in the experimental evidence indicates that the process is not as simple as was originally thought. Perhaps extrinsic reward does not act directly on intrinsic motivation. Deci (1975) has theorized that extrinsic rewards have their impact on feelings of personal control, which in turn determine intrinsic motivation. Others have hypothesized a related process, that pay decreases intrinsic motivation by causing the subject to devalue the task. Supposedly the subject wonders why the experimenter is paying him and concludes it must be because the task is boring and not worth doing for its own sake. Thus, the more control the subject feels the experimenter is exerting over him (the lower the felt personal control), the more the task is devalued. Perhaps the research issue ought not to be whether rewards are performance contingent or noncontingent, but what other aspects of the situation influence the salience of the reward as a control and thus cue the task devaluation effect.

A number of studies support the idea that rewards affect intrinsic motivation through feelings of personal control and devaluation of the task. For instance, Lepper, Greene, and Nisbett (1973) and Lepper and Greene (1975) reasoned that when a subject is promised a reward before engaging in an experimental activity, he will be more likely to feel that an external agent, the reward, caused the activity than if he receives an unexpected reward after completing the activity. Thus, expected rewards should make one feel that the task was not interesting since the experimenter had to bribe (pay) him to do it, while unexpected rewards received after working on the task should not have this effect. The researchers did find that, as hypothesized, expected rewards resulted in significantly lower intrinsic motivation than unexpected rewards.

Ross (1975) also manipulated the perceived importance of the reward as a cause of behavior. He promised two groups of subjects a reward for working on a task, then repeatedly reminded one group of the reward they would be receiving. The reward should have been more salient as a control and devaluation cue for the reminded group so their intrinsic motivation was expected to be lower. The results supported this hypothesis.

Kruglanski, Riter, Amitai, Margolin, Shabtai, and Zaksh (1975) showed that the perceived controlling power of a reward depends very much on the context in which the reward is given. Their experiment used several types of tasks, some in which financial reward was expected and appropriate, such as a penny pitching game, and some in which money was *not* part of the task by definition, such as block building. They found that financial reward *increased* intrinsic motivation when it was an appropriate, inherent part of the task, and decreased intrinsic motivation when it was clearly external to the task.

This is exactly what should happen if the devaluation of task hypothesis is true. When money is inherent in the task, it does not lead one to question his motives for working. However, when money is not part of the task automatically but is given nonetheless, it can cause one to believe that the task must not be worth doing for its own sake. This line of reasoning can shed some light on the results of Deci (1975), Calder and Staw (1975), Reiss and Sushinski (1975), and all the other researchers who found that extrinsic rewards decrease intrinsic motivation. In virtually all the previously mentioned studies, subjects were committed to participate, either voluntarily or for required course credit, before being offered any rewards, and the tasks were of a type not usually associated with payment. Thus, rewards were not at all inherent in the situation, and were perceived as external controlling forces with the power to decrease intrinsic motivation. Further, all these studies were laboratory studies using children or college students as subjects in a single session of less than three hours duration. Generalizing from this population and situation to actual employees working for pay on a real job as Deci (1976) does, would seem to be very risky at best. Perhaps the most critical difference between the two situations is that monetary payment is inherent in an actual job, where a guarantee of payment is a prerequisite to participation and there can be no such thing as a "no reward control group." If money is socially accepted as part of a job, it should not cause one to

devalue the task and feel less intrinsically motivated. Thus the external validity of the laboratory findings on money and intrinsic motivation must be seriously questioned.

The present study attempted to improve upon earlier research by creating a simulated work setting. Subjects who responded to a newspaper advertisement were hired for a part-time job lasting three days. Thus, for all subjects, payment was inherent in the situation. The effects of two types of payment systems, performance contingent and noncontingent, were evaluated in this realistic setting. However, in view of the inconclusive research evidence to date, no specific predictions were made concerning the relative effects of the two payment systems on intrinsic motivation.

The operation of personal control construct was also directly tested for the first time in this study. Conditions were created where subjects were able to either control their performance by varying their level of effort, or not control their performance at all. It was predicted that intrinsic motivation would be high when personal control was high and low when personal control was low.

Finally, the relationship of performance and feelings of competence to intrinsic motivation was explored. It was expected that performance would be positively related to intrinsic motivation, and that intrinsic motivation would be highest when both performance and personal control were high.

II. METHOD

Participants

Subjects were recruited by means of a "help wanted" advertisement calling for part-time workers for a short-term clerical job. The mean age of the subjects was 21 years with a range from 17 to 63, and the mean number of years of education was 13 with a range from grade school to graduate work. Thirty-two percent were male.

Procedure

All subjects worked two and one-half hours per day for three consecutive days. On the first day of work, subjects filled out a biographical data sheet, completed a "test" puzzle, and were all "hired." They then answered a prework questionnaire, were instructed as to the task and pay system, and began working. At the end of the work session, subjects were given a ten minute break while the experimenter looked over their work. After this break the subjects spent 20 to 30 minutes filling out a questionnaire. On subsequent days, subjects worked about two hours, took a break, and again completed the questionnaire.

Task

Subjects worked on letter matrix puzzles similar to those in Figure 1. Their task was to locate and circle the embedded words which appear on the word list. Pilot testing showed that this task was moderately interesting to most subjects. The explanation given for using such a task was, "We are interested in the development of several types of clerical skills such as visual speed and figure ground perception. We have found the letter matrix puzzles tap these skill areas better than most single clerical tasks."

Extensive pilot testing was conducted in order to determine the difficulty of each puzzle. Data were gathered on the average number of words found in five minutes, ten minutes, and fifteen minutes of work on each of 100 puzzles. In the final study, each puzzle was stamped "Number to Find ____." A number was inserted reflecting the average five, ten or fifteen minute score for that puzzle.

Puzzles were worked on in packets of three. Twenty minutes were allowed for each packet. Thus, the "Number of Find _____" of each puzzle together with the time limit determined the difficulty of each packet.

Performance was defined in terms of the number of puzzles completed in a twenty minute period. Finishing all three puzzles in the packet was considered high performance, finishing two was average, and finishing zero or one was low performance – regardless of the difficulty of the packet.

NUMBER TO FIND _____

area code
bills
booths
cables
calls
charges
circuits
collections
connections
dial tone
disconnect
exchanges
extensions
fees
foremen
information
installers
jacks
lineman
listings
long distance
message units
numbers
operators
person to person
phones
poles
princess
pushbutton
rates
repairs
service
signals
switches
systems
tolls
wires

I N F O R S T I U C R I C A P T O N
E X T E N S I O N S A B F S U I C E
C S I I K S O D E F O L T P S S A M
N A M C U R W D S O O I L C H G E R
A O A E A L O I T R N R A S B N I L
T J S T T C I H T U E S M I U I N A
S A E R A S S N E C U B L A T T O T
I S G E E E Y G E C H L M U T S I C
D A R S N P A S O M S E S U O I O E
G A A O S S O P A I E R S P N L O N
N C H A S E E T A V I N P O L E S N
O P C E S R C N N A T T O E A M E O
L A M L A V G N P O N C C T A W S C
J O L T H I R P I N S T A L L E R S
E O O W S C R E U P I R I B R A T I
T R F O R E M E N O P L E I L L I D
S S N O I T C E N N O C N P P E N D
S W A T C H T S E G N A H C X E S E

Figure 1. **Sample letter matrix puzzle.**

Experimental Manipulations

Personal Control. The intent of this manipulation was to create one condition in which effort led to performance, and one in which effort did not affect performance. This was done by varying packet difficulty. In the high personal control (unconstrained) condition, each packet contained two ten minute puzzles followed by one five minute puzzle. This meant that a subject who put forth average effort would be an average performer. That is, he or she would finish two of the three puzzles in the twenty minute period. High effort would lead to finishing three puzzles, and low effort to finishing zero or one.

In the low personal control (constrained) condition, puzzle packets were set up such that packet difficulty rather than subject effort was the primary determinant of performance. Performance was constrained at three levels: high, average, and low, so that the mean and variability in performance across all subjects in the constrained condition would be comparable to that in the unconstrained condition, a situation necessary for testing the competence hypothesis.

Constrained high performance packets contained three five minute puzzles, so the average subject had fifteen minutes of work to do in twenty minutes. This means that he or she should nearly always finish all three puzzles, even with low effort. Constrained average packets contained one five minute, one ten minute, and one fifteen minute puzzle. This arrangement made it quite easy to finish the first two puzzles in twenty minutes, but almost impossible to also finish the third. Thus, average performance was nearly assured, regardless of subject effort. Constrained low performance packets contained three fifteen minute puzzles, making it extremely difficult to finish more than one in twenty minutes.

In the constrained cells, subjects were randomly assigned to one of the three performance levels at the beginning of the first day. All puzzle packets they received on subsequent days were set to result in this assigned level of performance.

Pay Manipulation. Half the subjects were paid noncontingently at the rate of $2.10 per hour. The other half received payment contingent upon their performance on the puzzle packets. This latter group received $0.90 for each packet on which they showed high performance, $0.70 for average performance, and $0.50 for low performance. Note that average performance in the contingent condition resulted in the same rate of pay as the hourly system (figuring three twenty minute sessions per hour). In addition, all subjects were paid $2.10 per hour for filling out the questionnaires at the end of each work session. While subjects were urged to calculate their earnings at the end of each day, no actual payment was made until the end of the final day of work.

These two manipulations, personal control and pay system, resulted in a 2 x 2 design; that is, a given subject was paid either contingently or noncontingently and was either in the high control or low control condition. Sample sizes for each cell were: contingent – high personal control, 16; contingent – low personal control, 26; noncontingent – high personal control, 22; noncontingent – low personal control, 18.

Measures

Personal Control. Subjects' perceived personal control over performance was measured in two ways. First, two items asked directly how much control the subject thought he had over his performance. These items were answered on a five-point Likert scale and are as follows:

> It seemed that I had very little control over how many puzzles I finished in each packet.
>
> The amount of effort that I put in, that is, how hard I tried, really determined how well I performed on the puzzles.

The second measure of felt personal control over performance asked the subject to rank the importance of four factors in determining his performance. These factors were luck, task difficulty, effort, and ability. Ranks on the first two factors were reversed and summed to produce an attribution to external forces index and ranks on the last two factors were reversed and summed to form an internal attribution index.

A measure of perceived control by pay was also obtained by means of three Likert items. These items are:

The main thing that determined how hard I worked was the money I am making.

The pay system makes me feel like I have to work hard all the time, whether I feel like it or not.

The money I am making really had very little effect on how hard I worked.

Intrinsic Motivation

Three measures of intrinsic motivation were obtained each day. The first was a behavioral measure of intrinsic interest in the puzzle task. Subjects were given ten minutes of free time each day during which they could take a coffee break, talk with each other, or work on a "supplementary puzzle packet." Intrinsic motivation was defined as the number of words circled on this supplementary packet. Later analysis showed that this measure was not correlated with the other measures of intrinsic motivation described below. This may be due to contamination which was the result of a misunderstanding. Some of the contingently paid subjects erroneously thought that they were being paid for working on the puzzles during their free time, despite being repeatedly told that they were not.

The second measure was constructed by summing six of the intrinsic job satisfaction items from the short form of the Minnesota Satisfaction Questionnaire (MSQ), Weiss, Dawes, England, & Loftquist, 1967). This measure had a split half reliability of .80 when corrected by the Spearman-Brown formula. The items used in this measure can be found in Appendix A.

The third measure was the Task Reaction Questionnaire (TRQ), (Mayo, 1976). This 23-item scale was developed especially to measure intrinsic motivation. It contains items pertaining to task liking, task interest, feelings of accomplishment, feelings of being challenged, feelings of using one's important abilities, and so on (see Appendix B for the complete TRQ). The scale has been shown to possess construct validity (Mayo, 1976) and was found to have a corrected split half reliability of .96.

III. RESULTS

Manipulation Checks

To check subjects' perceptions of their payment system, the subjects answered the following item:

> As my performance (number of puzzles finished) goes **up**, my chances of making a lot of money for the time I put in on this job. . . Go way down (1), Go down (2), Go down a little (3), Stay the same (4), Go up a little (5), Go up (6), Go way up (7).

An analysis of variance performed on this measure (Table 1) showed a very strong main effect for payment system. The means for each payment group indicated that contingently paid subjects understood that their pay was related to their performance ($\bar{X} = 5.8$), while noncontingently paid subjects knew that it was not ($\bar{X} = 4.2$).

The degree to which subjects felt controlled by their pay had also been measured. Payment system had a strong effect on this measure (Table 1). Contingently paid subjects ($\bar{X} = 9.8$) felt more controlled by their pay than did noncontingently paid subjects ($\bar{X} = 6.7$).

Table 1. **Manipulation Checks by ANOVA on Three-Day Means**

	Effects					
	Pay System		Personal Control		Pay X Personal Control	
Dependent Variable	F	P	F	P	F	P
Performance to Pay Relationship	86.71	.001	.01	.99	.12	.99
Control by Pay	27.89	.001	.02	.99	.05	.99
Perceived Personal Control	4.74	.03	15.02	.001	.18	.99
External Attribution	3.40	.07	4.61	.03	.73	.99
Internal Attribution	1.13	.29	2.69	.10	.23	.99

The personal control (task difficulty) manipulation should have resulted in differing perceptions of personal control, external causality, and internal causality in the high and low personal control conditions. Table 1 presents analyses of variance on three-day means for these three measures. In general, perceptions of control do seem to be different in the two personal control conditions. Figure 2 gives a better picture of what actually happened to perceptions of control. Over time, subjects gradually became more aware of the amount of control that they had. Constrained subjects became more aware that task difficulty, an external factor beyond their control, was determining their performance while unconstrained subjects learned that they could control their own performance by effort and work strategies. T-tests on the measures in Figure 2 were all significant by the final day work.

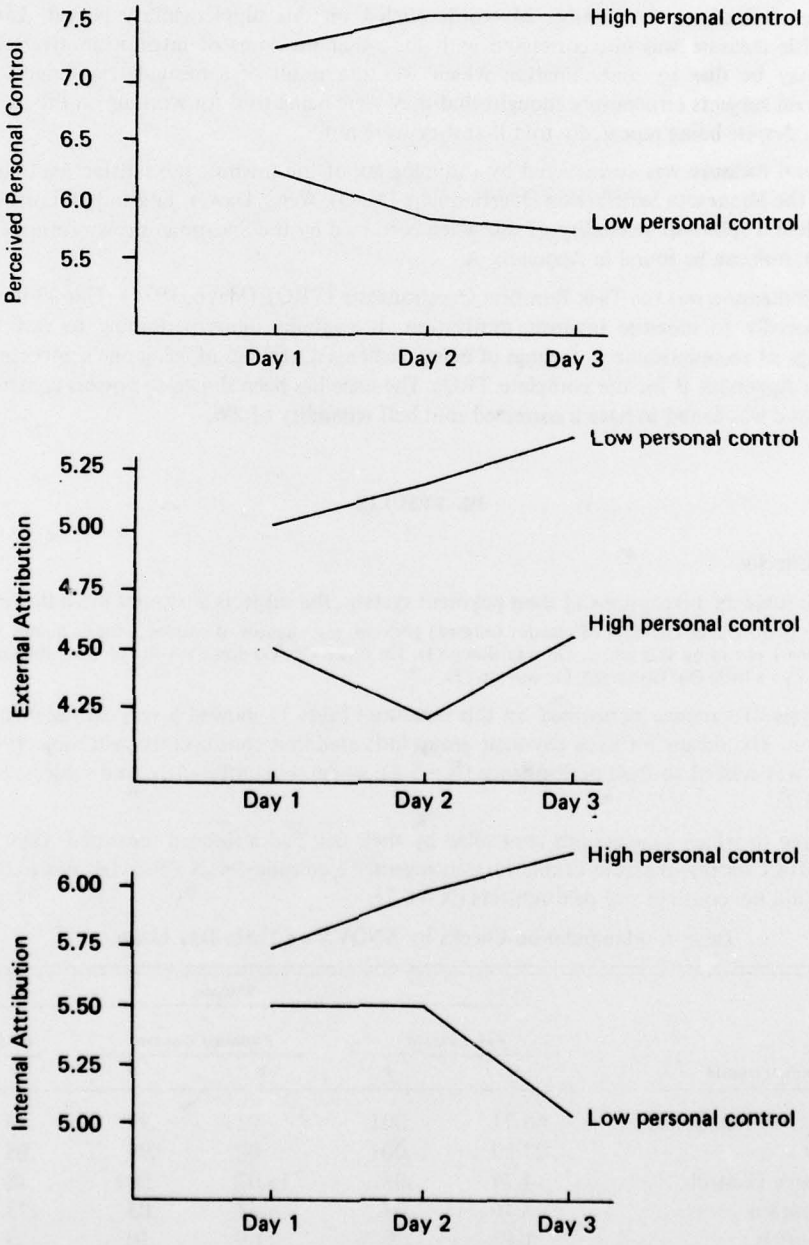

Figure 2. **Means of personal control measures on each day for high and low personal control groups.**

Primary Analyses

Table 2 presents analyses of variance on three-day means for the two self-report measures of intrinsic motivation. It can be clearly seen that there was no effect for pay system. Whether a subject was being paid contingently or noncontingently had absolutely no effect on his level of intrinsic motivation.

Table 2. **Pay by Personal Control Analyses of Variance on Three-Day Means for Measures of Intrinsic Motivation**

Source	Task Reaction Questionnaire		Minnesota Satisfaction Questionnaire — Intrinsic	
	F	P	F	P
Pay	.04	.99	1.44	.23
Personal Control	4.24	.04	8.57	.005
Pay X Personal Control	2.76	.10	1.51	.22

However, the personal control condition did strongly affect intrinsic motivation as can be seen by the significant main effects. Figure 3 clarifies what happened to intrinsic motivation over the three days of the study. The increase or decrease in intrinsic motivation in the two personal control groups parallels the growing awareness of internal or external control of performance documented in Figure 2. Thus it appears that personal control is causally related to intrinsic motivation, as predicted.

It was also predicted that feelings of competence would affect intrinsic motivation. To test this, subjects were split into high and low groups on the basis of self-rated performance and a performance by personal control analysis of variance was conducted. Subjects were then re-classified into high and low performing groups based on their actual performance and the analysis was repeated. These results appear in Table 3. There were no significant main effects either for self-rated performance (perceived competence) or actual performance (actual competence). However, there does appear to be an interactive relationship between competence and personal control, and intrinsic motivation. Table 4 presents the cell means for the two measures of intrinsic motivation. It appears that intrinsic motivation is high only when both competence and personal control are high. This conclusion is supported by a planned comparison of this cell to the average of the other three cells which was significant at the .005 level.

IV. DISCUSSION

The first area under investigation in this study was the effect of two types of payment systems (contingent and noncontingent) on intrinsic motivation. Although previous research has shown mixed results, the argument of some researchers (Deci, 1976) is that contingent extrinsic rewards should result in a decrease in intrinsic motivation. Our results indicated that contingent extrinsic rewards did not decrease intrinsic motivation as compared to noncontingent rewards, although subjects did feel more controlled by contingent payment.

As stated earlier, payment is a necessary part of any "job." Kruglanski et al. (1975) would agree that payment is socially accepted as inherent in a work setting and thus should not harm intrinsic motivation. That is, since one *must* be paid for working on a job, whether it is interesting or not, he does not have to devalue the task in order to understand *why* he is being paid. Thus, the feelings of external control caused by pay in a work setting, whatever their level, did not trigger a devaluation of the task; and therefore, no differences in intrinsic motivation appeared between the two pay groups. While intrinsic motivation and extrinsic rewards may interact under some circumstances, this preliminary research suggests that they are

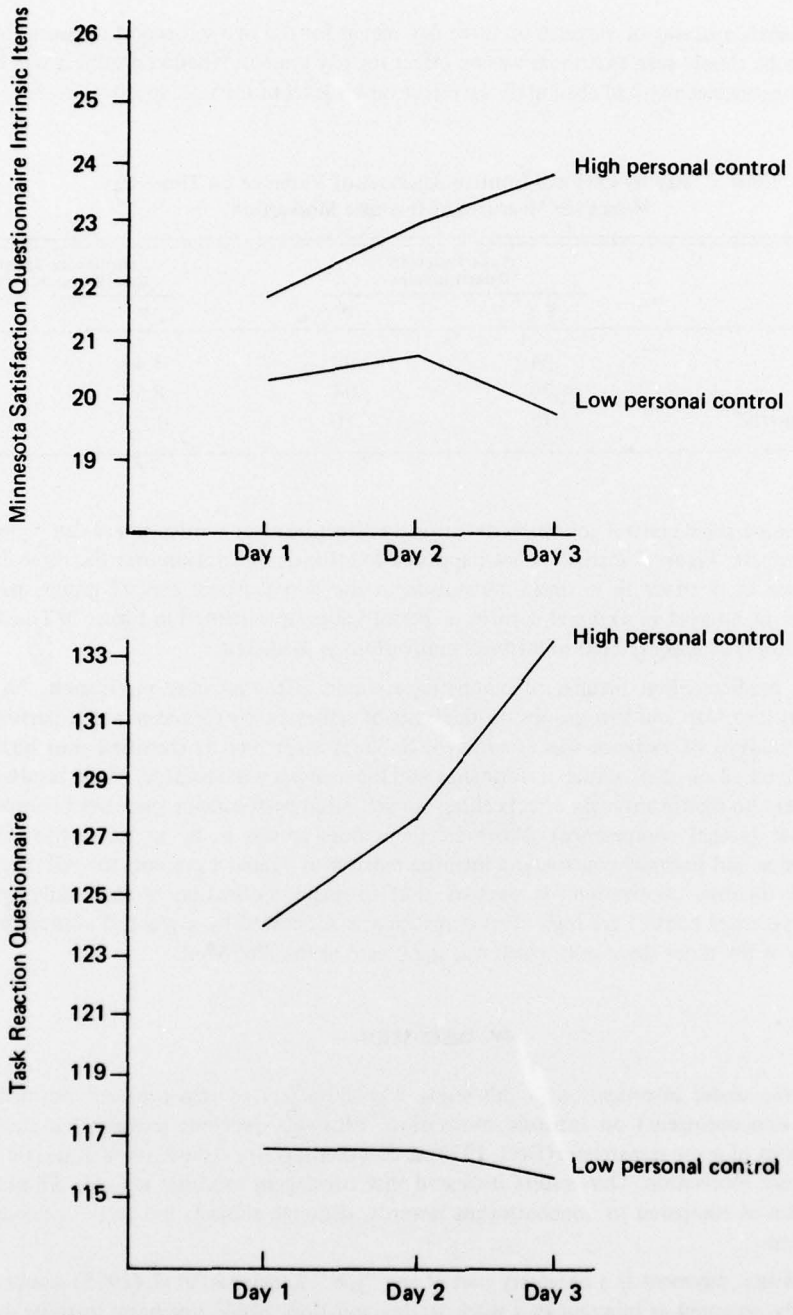

Figure 3. **Means on measures of intrinsic motivation for each day in high and low personal control groups.**

Table 3. **Performance by Personal Control Analyses of Variance on Three-Day Means for Measures of Intrinsic Motivation**

Source	Task Reaction Questionnaire		Minnesota Satisfaction Questionnaire — Intrinsic	
	F	p	F	p
Self-Rated Performance	3.1	.08	.5	.99
Personal Control	4.9	.03	7.7	.01
Self-Rated Performance X Personal Control	2.7	.10	1.8	.18
Actual Performance	1.6	.20	1.7	.19
Personal Control	4.9	.03	8.3	.01
Actual Performance X Personal Control	8.4	.01	8.1	.01

Table 4. **Comparison of High Personal Control, High Performance Cell to All Other Cells**

Source	Measure	High Personal Control		Low Personal Control		df	t	p
		High Performance	Low Performance	High Performance	Low Performance			
Split on Actual Performance	MSQ	24.4	20.8	19.8	20.4	78	4.09	.005
	TRQ	139	116	113	120	78	3.69	.005
Split on Self-Rated Performance	MSQ	23.7	21.8	20.1	20.5	78	2.75	.005
	TRQ	139	119	117	116	78	3.18	.005

independent in an on-going work situation. This suggests that any type of pay system which seems appropriate could be used without fear of harming intrinsic motivation.

The first formal prediction was that personal control over performance would be related to intrinsic motivation. This was supported. As the manipulation check showed, people are capable of perceiving the amount of control they have in a work setting. More important, the amount of personal control one has does affect intrinsic motivation. High personal control resulted in significantly higher levels of intrinsic motivation than did low personal contol. Thus, this study provides support for the idea that personal control is an important determinant of intrinsic motivation.

This result has implications for the design of jobs in the Air Force. For instance, giving a worker more control of his own performance by removing situational constraints, threats of punishment, and close supervision should lead to feeling personally responsible for one's performance. This should make it possible to experience the intrinsic rewards associated with working such as feelings of accomplishment, pride in one's work, and perhaps a feeling of self-actualization from using one's abilities to the fullest.

The idea that personal control over one's work can enhance motivation is not new. Job enrichment researchers have been talking about the importance of autonomy and responsibility for years, perhaps

beginning with Herzberg, Mausner, & Snyderman (1959). Researchers who have found that control, autonomy, responsibility, and so on are positively related to work attitudes and motivation include Ford (1969), Hackman and Lawler (1971), and Turner and Lawrence (1965). The present study makes a contribution to this earlier body of research by providing experimental evidence on the importance of personal control without confounding this variable with other aspects of job enrichment.

The final area of interest in the present research was the relationship of competence to intrinsic motivation. We found that there was no direct relationship of competence to intrinsic motivation. Instead, competence interacted with personal control such that both these variables had to be high in order for intrinsic motivation to be high. In other words, one has to feel responsible for his success on a task in order to experience the intrinsic rewards that come with high performance. One cannot feel a sense of accomplishment for an achievement that was due to external forces rather than his own effort and ability.

These findings also have implications for job design. In order for workers to feel competent and intrinsically motivated, they need to work on jobs that are neither too difficult nor too easy, and where success depends primarily on personal factors like effort rather than external factors beyond the control of the workers. Furthermore, workers should be given the information they need to realistically assess their level of competence.

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APPENDIX A: INTRINSIC ITEMS FROM THE MINNESOTA SATISFACTION QUESTIONNAIRE

Ask yourself: How satisfied am I with this aspect of my job this week?

VS means I am very satisfied with this aspect of my job.

S means I am satisfied with this aspect of my job.

N means I can't decide whether I am satisfied or not with this aspect.

DS means I am dissatisfied with this aspect of my job.

VDS means I am very dissatisfied with this aspect of my job.

On my present job, this is how I feel about:	VDS	DS	N	S	VS
The chance to do different things from time to time	___	___	___	___	___
The feeling of accomplishment I get from the job	___	___	___	___	___
The chance to do something that makes use of my abilities	___	___	___	___	___
The freedom to use my own judgement	___	___	___	___	___
The chance to try my own methods of doing the job	___	___	___	___	___
Being able to keep busy all the time	___	___	___	___	___

APPENDIX B: TASK REACTION QUESTIONNAIRE

Listed below are a series of statements relating to the puzzles that you have been working on. Please take your time and respond thoughtfully and honestly to these statements by indicating the extent to which you agree with each.

	Strongly disagree	Moderately disagree	Slightly disagree	Not sure	Slightly agree	Moderately agree	Strongly agree
1. There are several important abilities of mine that were required in order to work effectively on the puzzles.....	1	2	3	4	5	6	7
2. I liked the idea that I had enough freedom and responsibility to do the puzzles the way I wanted.....	1	2	3	4	5	6	7
3. The challenge posed by these puzzles really aroused my interest in them.....	1	2	3	4	5	6	7
4. My feelings while completing the puzzles could best be described by the word excitment....	1	2	3	4	5	6	7
5. At various times I felt like I was really achieving something while working on the puzzles.....	1	2	3	4	5	6	7

	Strongly disagree	Moderately disagree	Slightly disagree	Not sure	Slightly agree	Moderately agree	Strongly agree
6. There is something about solving these puzzles that I find very appealing.....	1	2	3	4	5	6	7
7. I enjoyed using what I consider to be a strong natural ability when it comes to these puzzles.....	1	2	3	4	5	6	7
8. The nice feeling associated with working these puzzles certainly was a determinant of how well I did.....	1	2	3	4	5	6	7
9. I really became absorbed with the puzzle task while working on it.....	1	2	3	4	5	6	7
10. These puzzles gave me the opportunity to learn something new and interesting.....	1	2	3	4	5	6	7
11. The freedom I had to work at my own pace led me to really work hard on the puzzles.....	1	2	3	4	5	6	7
12. The unpredictable qualities of the puzzle task were quite intriguing.....	1	2	3	4	5	6	7
13. These puzzles gave me the opportunity to develop new skills.....	1	2	3	4	5	6	7
14. After working on these puzzles for a while, I felt like a pretty competent individual.....	1	2	3	4	5	6	7
15. My talents were effectively utilized in solving these puzzles.....	1	2	3	4	5	6	7
16. I liked the opportunity I had to decide for myself how I would solve the puzzles.....	1	2	3	4	5	6	7
17. I would describe my time with these puzzles as a pleasant experience.....	1	2	3	4	5	6	7
18. There was plenty of opportunity to exercise my ingenuity and inventiveness on these puzzles.....	1	2	3	4	5	6	7

	Strongly disagree	Moderately disagree	Slightly disagree	Not sure	Slightly agree	Moderately agree	Strongly agree
19. After working for a while, I had the feeling that I was really good at these types of puzzles.....	1	2	3	4	5	6	7
20. I felt considerable pride in knowing that I was doing well on the puzzles.....	1	2	3	4	5	6	7
21. The puzzles could accurately be described as fun.....	1	2	3	4	5	6	7
22. One source of motivation was the opportunity for independent throught and action while working the puzzles.....	1	2	3	4	5	6	7
23. The puzzles really held my attention from the very beginning.....	1	2	3	4	5	6	7

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